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Connecting device for an electrosurgical instrument

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DESCRIPTION

The invention relates to a connecting device for an electrosurgical instrument that comprises at least one gas supply line and one power supply line, according to the precharacterizing clause of Claim 1, as well as to an application for such a connecting device according to the precharacterizing clause of Claim 7.

Electrosurgical instruments such as, for example, the APC probes used in endoscopy, frequently comprise a gas conduit through which gas is supplied, and a power supply line that conducts HF electrical current. As a rule, the probes are connected to an electrical appliance that controls the supplies of gas and current, by means of connecting leads.

The patent EP 0 447 121 A2 discloses a probe connected to such an appliance by connecting devices such that the gas and HF current conducted to the probe in separate connecting devices are not brought together until they are in the vicinity of the front tip of the probe. Therefore, especially when the probe is used in gastroenterology, secretions and fluids from human or animal bodies can enter the gas and power supply lines during treatment and contaminate them. This contamination occurs not only in the parts of the lines that are inside the probe but also in those parts connected to the probe. As a consequence, after such contamination has occurred, both the probe and also the connecting lines must be replaced.

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Although the connecting devices disclosed in EP 0 447 121 A2 for connecting the probe to the leads that come from the appliance incorporate a filter, which is intended to provide protection against such contamination, this filter is
5 positioned in such a way that only the appliance is protected.

Accordingly, it is the objective of the present invention to make available a connecting device for electrosurgical instruments that makes it possible efficaciously to protect the connecting leads associated with the instrument, or integrated
10 therein, against contamination by secretions and fluids from human or animal bodies. A further objective of the invention is to disclose an application for such a connecting device.

This objective is achieved by the characteristics given in Claim 1, with regard to the device itself, and by those in
15 Claim 7 with regard to the application.

An essential point of the invention resides in the fact that a connecting device for an electrosurgical instrument within a housing comprises a branching device by way of which a power supply line disposed in a gas supply line is diverted out of
20 the gas supply line so as to form a gas-connection end piece and a power-connection end piece, so that a filter can be disposed within the housing in the gas-connection end piece. The gas-connection end piece and the power-connection end piece are coupled to a plug connector fixed to the housing, which is
25 to be inserted into a socket in an appliance or in connecting lines leading to the appliance. The placement of the filter immediately behind the surgical instrument, which for example can be constructed as a probe or pencil, prevents secretions and fluids from penetrating into the connecting lines and/or
30 the appliance, so that it is unnecessary to exchange the connecting leads after the operation has been completed.

It is advantageous for the branching device to comprise a first aperture into which the gas supply line, together with the

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power supply line disposed therein, can be inserted like a plug, as well as a second aperture into which the filter can be similarly inserted. This enables a simple and rapid exchange, after a preferably prespecified period of use, of either the
5 branching device including the filter or the filter by itself. For this exchanging procedure the housing must be opened, the relevant elements removed and their replacements inserted, and the housing closed again. Thus the filter can be readily
10 replaced before a filter element contained therein becomes oversaturated.

According to a preferred embodiment the branching device comprises an integrated cable channel to accommodate the diverted power supply line. The cable channel assists stable
15 positioning of the power supply line within the branching device and hence contributes to forming a transition region, i.e. the region in which the power supply line branches off, that is not vulnerable to damage.

The electrosurgical instrument can be designed for single use, as it can be rapidly and simply uncoupled from the connecting
20 device, by way of a plug-and-socket arrangement, and a new instrument connected to the device.

Preferably the connecting device is used for an APC instrument, which can be an APC probe.

Other advantageous embodiments will be apparent from the
25 subordinate claims.

Advantages and useful features are treated in the following description with reference to drawings, wherein

Fig. 1 shows an embodiment of the connecting device in
30 accordance with the invention, partially opened, in perspective plan view;

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Fig. 2 is an enlarged drawing of part of the embodiment of the connecting device in accordance with the invention shown in Figure 1, and

Fig. 3 shows a perspective view of the underside of the embodiment of the connecting device in accordance with the invention shown in Figures 1 and 2.

In Figure 1, an embodiment of the connecting device in accordance with the invention is shown in perspective. The connecting device 1 comprises a housing, only part of which is shown here; normally the housing completely encloses its contents. The housing 2 can be opened and closed again by means of a sliding mechanism or flap, in order to provide access to the elements contained in the housing 2, in particular a filter.

A probe 3 is attached, preferably releasably, to the housing at one of its ends. At another end of the housing is disposed a plug arrangement 4 designed to be inserted into a socket in an appliance or attached to connecting leads that run to that appliance.

A gas supply line 5 connected to the probe 3 encloses a power supply line 6. Both supply lines are connected to a branching device 7 by means of which the power supply line 6 is guided out of the gas supply line 5 to form a power-connection end piece 8 and a gas-connection end piece 9.

Between the gas-connection end piece 9 and the branching device 7 a filter 10 is disposed in such a way that it can be exchanged.

Figure 2 is an enlarged perspective plan view of part of the connecting device shown in Figure 1. It can be seen in Figure 2 that the gas supply line 5 with the power supply line 6 disposed therein is connected to the branching device 7 by way

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of an aperture 11 in the branching device, like a plug in a socket. Into a second aperture 12 of the branching device 7 the filter 10 has been inserted.

5 Having branched away from the gas supply line 5, the power supply line 6 is guided within a cable channel 13 disposed in the branching device 7 in such a way that it pass around the filter 10 with no further guidance, until it reaches the power-connection end piece 8. This makes it possible to exchange the filter 10 situated between the branching device 7 and part of
10 the gas-connection end piece 9, with no need to interrupt the power supply line 6.

In Figure 3 the underside of the embodiment of the connecting device according to Figures 1 and 2 is shown in perspective. This drawing makes clearer that the filter 10 opens into part
15 of the gas connection end piece 9, while the power supply line 6 opens into power-connection end piece 8 on the underside of the housing. Hence the connection end pieces 8 and 9 do not impede the process of exchanging the filter 10, inasmuch as the filter 10 is removed and re-inserted from above the housing.

20 The gas-connection end piece 9 and the power-connection end piece 8 are attached to the plug 4 so that they can be connected to connecting leads.

At this juncture it should be pointed out that all of the parts described above, in particular the details represented in the
25 drawings, are claimed as invention, individually or in any combination. Modifications thereof are familiar to a person skilled in the art.

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List of reference numerals

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|----|----|----------------------------|
| | 1 | Connecting device |
| | 2 | Housing |
| | 3 | Probe |
| 5 | 4 | Plug |
| | 5 | Gas supply line |
| | 6 | Power supply line |
| | 7 | Branching device |
| | 8 | Power-connection end piece |
| 10 | 9 | Gas-connection end piece |
| | 10 | Filter |
| | 11 | First aperture |
| | 12 | Second aperture |
| | 13 | Cable channel |

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